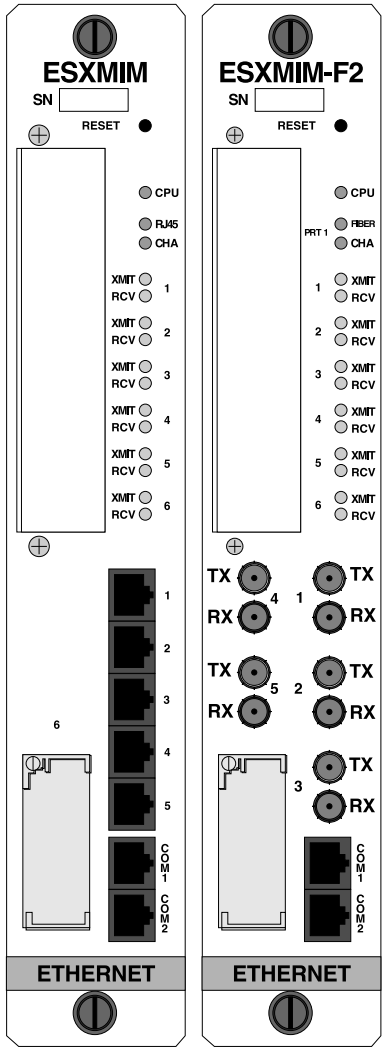
ESXMIM/ESXMIM-F2 ETHERNET SWITCH MODULE

INSTALLATION GUIDE



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The Complete Networking Solution™

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NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment uses, generates, and can radiate radio frequency energy and if not installed in accordance with the operator's manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

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Manufacturer's Name:	**Cabletron Systems, Inc.**
Manufacturer's Address:	**35 Industrial Way** **PO Box 5005** **Rochester, NH 03867**
European Representative Name:	**Mr. J. Solari**
European Representative Address:	**Cabletron Systems Limited** **Nexus House, Newbury Business Park** **London Road, Newbury** **Berkshire RG14 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 89/336/EEC** **EC Directive 73/23/EEC** **EN 55022** **EN 50082-1** **EN 60950**
Equipment Type/Environment:	**Networking Equipment, for use in a Commercial or Light Industrial Environment.**

We the undersigned, hereby declare that the equipment packaged with this notice conforms to the above directives.

Manufacturer	Legal Representative in Europe
Mr. Richard Michaud	Mr. J. Solari
Full Name	Full Name
Manager of Engineering Services	Managing Director - E.M.E.A.
Title	Title
Rochester, NH, USA	Newbury, Berkshire, England
Location	Location

CONTENTS

CHAPTER 1
INTRODUCTION

Welcome to the Cabletron Systems **ESXMIM/ESXMIM-F2 Ethernet Switch Module Installation Guide**. This manual provides installation instructions and reference information for the ESXMIM and ESXMIM-F2 Ethernet Switching Media Interface Modules.

This manual covers both the ESXMIM and the ESXMIM-F2. The name ESXMIM will be used to refer to both of the modules unless it is necessary to describe features that are unique to a specific module.

1.1 HOW TO USE THIS MANUAL

To gain a full understanding of this device and its capabilities, and to help eliminate any potential problems during or after installation, please be sure to read and understand all of the instructions/information in this document and in the release notes supplied with your ESXMIM.

You should have a general working knowledge of Ethernet or IEEE 802.3 type data networks prior to installing the ESXMIM. The following summarizes the organization of this manual.

Chapter 1, **Introduction**, discusses the use and conventions of the **ESXMIM/ESXMIM-F2 Ethernet Switch Module Installation Guide**, details the procedures to follow for obtaining assistance from Cabletron Systems, and provides a list of related documentation.

Chapter 2, **Controls and Indicators**, identifies and describes the components and monitoring indicators that make up the ESXMIM. This chapter contains information that is essential to the understanding of the procedures in the rest of this manual.

Chapter 3, **Installation**, details the procedures to follow when unpacking, testing, and installing the ESXMIM. The chapter contains information and step-by-step instructions for connecting network cabling to the ESXMIM and closes with a procedure which may be used to test the operation of the ESXMIM in the network.

Chapter 4, **Troubleshooting**, describes how to use LANVIEW LEDs on the ESXMIM. The chapter defines the different LED conditions and provides a table of simple troubleshooting instructions for module-related difficulties.

Appendix A, **Specifications**, provides the physical specifications and operating requirements of the ESXMIM. This appendix also contains serial port pinout tables for constructing Local Management cables.

Appendix B, **BRIM/EPIM Information**, describes two series of modules called BRIMs and EPIMs, which may be added to the ESXMIM to provide additional capabilities or connectivity options.

Appendix C, **Upgrading the ESXMIM**, details the procedures that must be followed when expanding the capabilities of the ESXMIM. This appendix contains information on memory upgrades and the addition of EPIM modules to the ESXMIM.

Appendix D, **Ethernet Cabling Requirements**, describes the test characteristics that Ethernet cables must adhere to in order to be standards-compliant. Any Ethernet link or cable that is to be connected to the ESXMIM should be verified to be within the specifications and limitations provided in this appendix.

1.2 ESXMIM OVERVIEW

The ESXMIM and ESXMIM-F2 are multi-interface Ethernet switching modules designed to provide maximum throughput while supplying comprehensive network management functionality. The ESXMIM and ESXMIM-F2 must be configured in a Cabletron Systems Multi Media Access Center (MMAC) hub.

1.3 DOCUMENT CONVENTIONS

The following are conventions used within this document.

1.3.1 Warnings and Notifications

Note symbol. Calls the reader's attention to any item of information that may be of special importance.

Tip symbol. Conveys helpful hints concerning procedures or actions.

Caution symbol. Contains information essential to avoid damage to the equipment.

Warning symbol. Warns against an action that could result in equipment damage, personal injury or death.

1.3.2 Document Format

Figures throughout the document are identified by chapter and illustration number. Many figures contain small numbers at the lower right-hand corner of the illustration. These are Cabletron Systems document control numbers and are not essential to understanding of the document.

References to chapters or sections within this document will be printed in **boldface** type.

References to other publications or documents will be printed in *italic* type.

1.4 RELATED DOCUMENTS

Use the following manuals to supplement the procedures and other technical data provided in this manual. This manual references procedures in these manuals, where appropriate, but does not repeat them.

Cabletron Systems *MMAC Overview and Setup Guide*

Cabletron Systems *Bridge/Router Interface Module Guide(s)*

Cabletron Systems *ESXMIM/ESXMIM-F2 Local Management Guide*

Cabletron Systems *SPECTRUM Element Manager User's Guide*

1.5 GETTING HELP

If you need additional support related to the ESXMIM, or if you have any questions, comments, or suggestions concerning this manual, contact Cabletron Systems Technical Support:

By phone	(603) 332-9400 Monday – Friday; 8 A.M. – 8 P.M. Eastern Time
By CompuServe	GO CTRON from any ! prompt
By Internet mail	support@ctron.com
By FTP	ctron.com (134.141.197.25)
Login	*anonymous*
Password	*your email address*

Before calling Cabletron Systems Technical Support, have the following information ready:

- A description of the failure
- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)
- A description of your network environment (layout, cable type, etc.)
- Network load and frame size at the time of trouble (if known)
- The serial and revision numbers of all Cabletron Systems products in the ESXMIM network
- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)
- Any previous Return Material Authorization (RMA) numbers

CHAPTER 2
CONTROLS AND INDICATORS

This chapter identifies and describes the components and operational indicators of the ESXMIM.

2.1 PARTS OF THE ESXMIM

In some instances, the ESXMIM and ESXMIM-F2 provide different front panel connectivity options, LED indicators, or other labeling. In these instances, the configuration of the ESXMIM will be discussed first.

2.1.1 The Faceplate

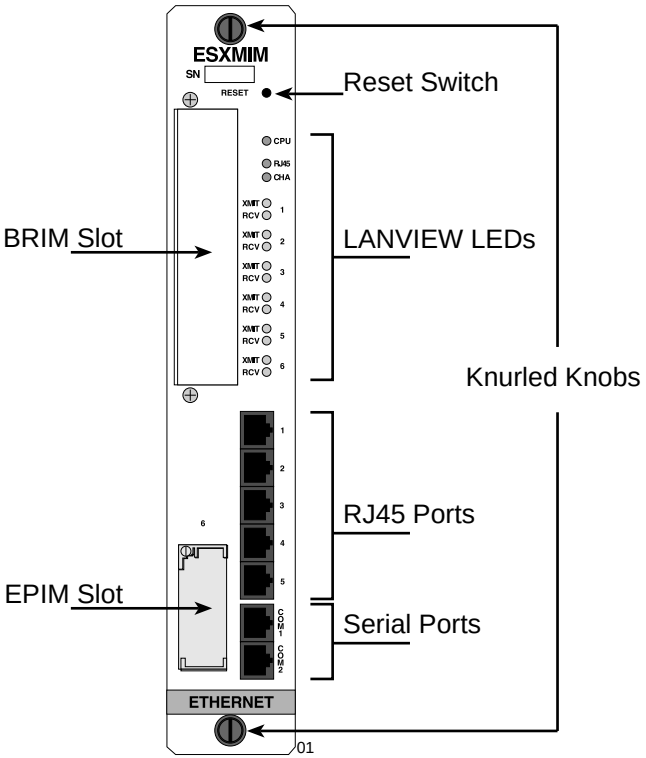


Figure 2-1 The ESXMIM Faceplate

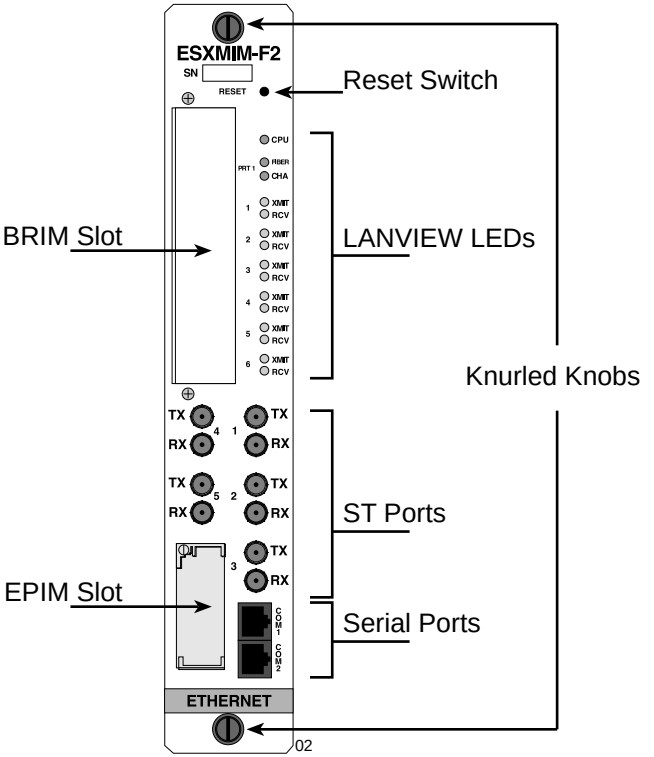


Figure 2-2 The ESXMIM-F2 Faceplate

Knurled Knobs

The black plastic knurled knobs on the faceplate of the ESXMIM are used to turn the securing screws that hold the ESXMIM module in place in the MMAC chassis.

BRIM Slot

The BRIM slot is a covered opening in the faceplate that can be configured with a BRIM module. For a list of BRIM modules available for use in the ESXMIM, refer to Appendix B, **BRIM/EPIM Information**.

EPIM Slot

The EPIM slot is a covered opening in the ESXMIM faceplate that can be configured with an optional EPIM module. For a list of EPIM modules which may be used in the ESXMIM, refer to Appendix B, **BRIM/EPIM Information**.

Reset Button

The recessed reset button re-initializes the ESXMIM processor. The activation of this switch will not initialize Non-Volatile Random Access Memory (NVRAM) where the ESXMIM stores configuration and management parameters. The Reset button may be pressed with the point of a pencil or pen. Once pushed in, the ESXMIM will re-initialize itself.

LANVIEW LEDs

The ESXMIM incorporates the LANVIEW status monitoring and diagnostic system. LANVIEW LEDs can help diagnose many problems, such as a fault in network cabling. LANVIEW LEDs are identified in Section 2.1.3, **LANVIEW LEDs**.

RJ45 Ports

The ESXMIM module provides five front panel RJ45 ports for connection to 10BASE-T links. The RJ45 ports of the ESXMIM use the 10BASE-T standard pinouts and signaling.

ST Ports

The ESXMIM-F2 provides five pairs of front panel ST ports for connection to five 10BASE-F links. The ST ports of the ESXMIM-F2 are 10BASE-F and FOIRL compliant.

Serial Ports

The ESXMIM faceplate provides two serial communications ports for the connection of out-of-band management devices.

2.1.2 Internal Components

The components listed in the following entries are all hidden inside the MMAC chassis when the ESXMIM has been installed. These components may be located by removing the ESXMIM from the chassis and holding the module in the orientation shown in Figure 2-3 and Figure 2-4.

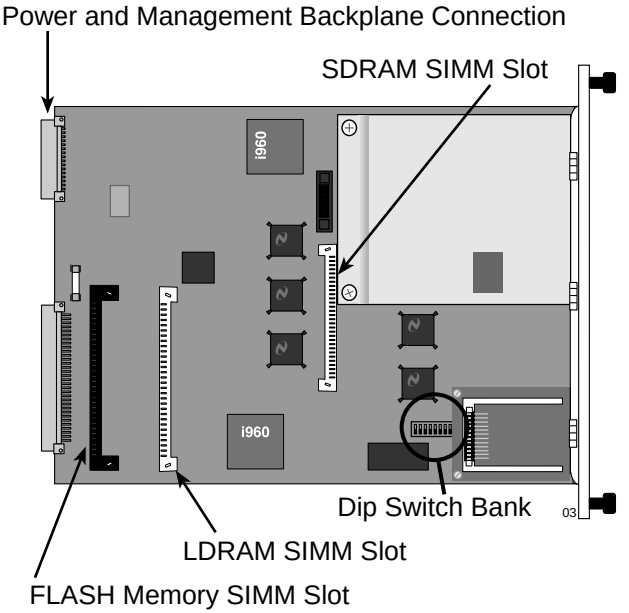


Figure 2-3 ESXMIM Internal Components

Power and Management Backplane Connection

The ESXMIM connects to the power and management backplane bus of the MMAC chassis through this multipin connector.

SDRAM SIMM Slot

The ESXMIM motherboard provides the option of upgrading memory capacity by using Single In-line Memory Modules (SIMMs).

The ESXMIM comes with 4 Megabytes (MB) of Shared Dynamic Random Access Memory (SDRAM). SDRAM holds packets coming onto the module temporarily while forwarding, filtering, and error checking decisions are made.

LDRAM SIMM Slot

The ESXMIM comes with 4 MB of Local Dynamic Random Access Memory (LDRAM). LDRAM is the “Main” memory from which the switching functionality of the ESXMIM operates.

FLASH Memory SIMM Slot

The ESXMIM incorporates 2 MB of FLASH Electrically Erasable Programmable Read Only Memory (FLASH EEPROM). FLASH memory holds the operating instruction code of the ESXMIM. When the module is activated, the instruction code (firmware) held in FLASH memory is forwarded to Main memory, decompressed, and used to startup the ESXMIM.

The use of FLASH memory, in conjunction with the runtime download capabilities of the ESXMIM, allows for the downloading of firmware to the module without requiring that the module be shut down. The firmware download may be performed at any time during the operation of the module, and the new firmware image will be utilized at the next reset of the module.

Dip Switch Bank

The ESXMIM provides a bank of eight dual-position, or “dip” switches. Several of these switches are used for testing purposes during the manufacturing process. The dip switches can also be used to clear the NVRAM of the ESXMIM which contains configuration and local management settings, or to force the ESXMIM to request a new firmware image from a properly configured BOOTP server.

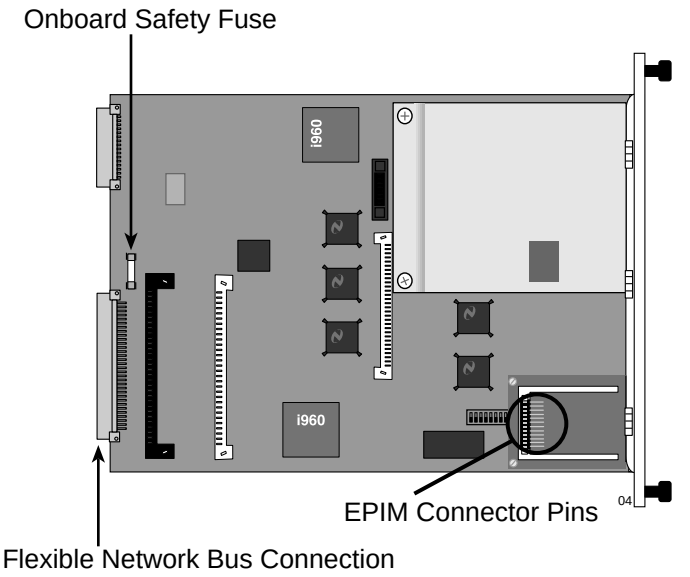


Figure 2-4 ESXMIM Internal Components

EPIM Connector

The EPIM connector is a set of built-in pins that connect the ESXMIM to an optional EPIM module. The proper insertion of the EPIM will automatically connect these pins to the connector located on the EPIM.

Onboard Safety Fuse

The onboard safety fuse protects the ESXMIM from potentially damaging power spikes or surges. Under normal operation, the safety fuse will not require customer concern.

Flexible Network Bus Connection

This multipin connector allows the ESXMIM to connect to Ethernet Channel A of the MMAC Flexible Network Bus backplane.

2.1.3 LANVIEW LEDs

The LANVIEW LEDs on the ESXMIM faceplate provide diagnostic and status monitoring information. The LEDs are identified by labels which border the LED in question.

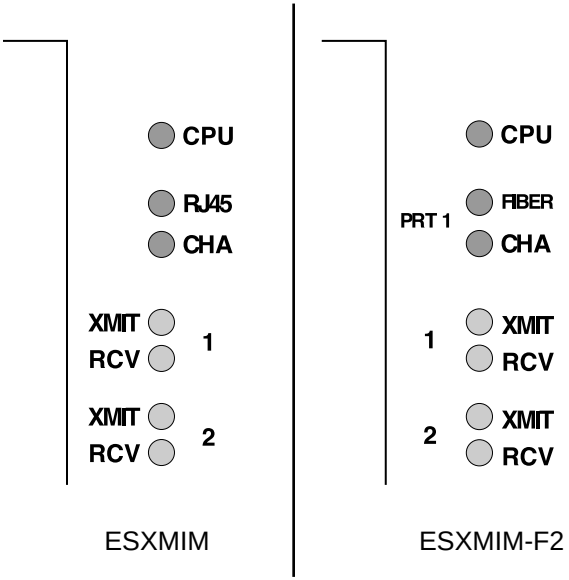


Figure 2-5 ESXMIM LANVIEW LEDs

The use of these LEDs for troubleshooting is covered in Chapter 4, **Troubleshooting**. The following LEDs are on the faceplate of the ESXMIM:

CPU
The CPU LED indicates the operating status of the ESXMIM, and is primarily concerned with the operation of the onboard twin i960 RISC processors.

RJ45
The RJ45 LED of the ESXMIM indicates that interface number one of the ESXMIM module has been assigned to the front panel RJ45 port #1.

FIBER
The FIBER LED of the ESXMIM-F2 indicates that interface number one of the ESXMIM-F2 module has been assigned to the front panel ST port pair #1.

CH A

The CH A LED indicates the ESXMIM bridge interface number one has been assigned to the backplane Ethernet Channel A connection.

XMIT

The XMIT LED indicates the transmit status of the port or interface it is associated with.

RCV

The RCV LED indicates the reception of Ethernet packets by the port or interface the LED is associated with.

CHAPTER 3
INSTALLATION

This chapter contains instructions for the following procedures:

- Preparing the ESXMIM for installation
- Testing the ESXMIM prior to network connection
- Installing the ESXMIM into a Multi Media Access Center (MMAC)
- Connecting the ESXMIM to a network
- Testing the installed ESXMIM

3.1 UNPACKING THE ESXMIM

Unpack the ESXMIM as follows:

Observe all antistatic precautions when handling sensitive electronic equipment.

1. Remove the shipping material covering the ESXMIM.
2. Verify the contents of the packing carton. The carton, as shipped, should contain the following items:

Item	Quantity
ESXMIM	1
Disk Containing Firmware Images	2
Grounding Strap	1
RJ45 Adapter Kit	1
Release Notes	1
ESXMIM Manuals	2

3. Carefully remove the module from the shipping box. Leave the module in its non-conductive bag until you are ready to install it.
4. Visually inspect the non-conductive bag. If there are any signs of damage, contact Cabletron Systems Technical Support immediately.
5. Place the static grounding strap properly on your wrist before opening the non-conductive bag.
6. Open the non-conductive bag by tearing the black and yellow tape seal.

Do not cut the bag open, as damage to the ESXMIM may result.

7. Perform a second visual inspection of the module.

3.2 SETTING MODE SWITCHES

A bank of dip switches, located at the bottom of the ESXMIM (Figure 3-1), provide several configuration options. All switches ship in the **OFF** position.

Never adjust switch settings while the ESXMIM is on. Not only is this dangerous, but the *change in state* (i.e., position) activates the switch function only after reinstalling or cycling power to the board.

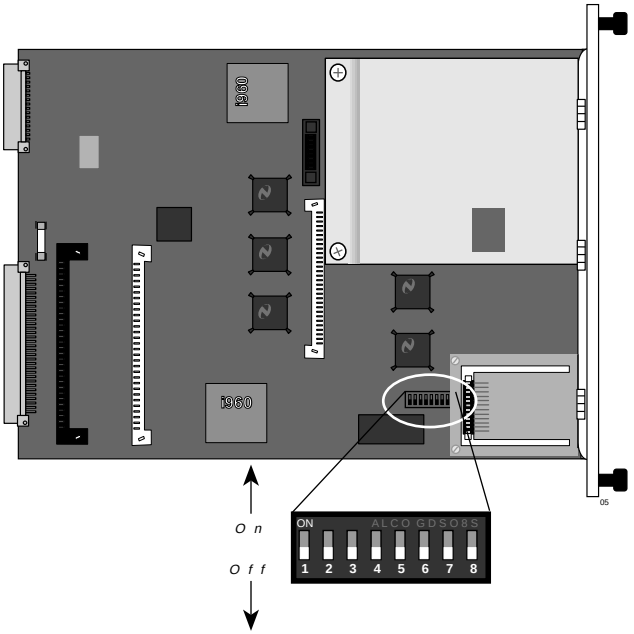


Figure 3-1 ESXMIM Dip Switches

Switch definitions are as follows:

- Switch 1: Cabletron Systems use only.
- Switch 2: Cabletron Systems use only.
- Switch 3: Not Used.
- Switch 4: Not Used.
- Switch 5: Cabletron Systems use only.
- Switch 6: Forced Download. Changing the state of this switch (i.e., moving the switch from one position to another) clears download information from Non-Volatile Random Access Memory (NVRAM) and forces a BOOTP download

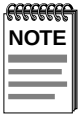
  After changing the position of switch 6 and restarting the ESXMIM, the ESXMIM requests a new image download until it either receives a new image or the reset button on the front panel is pressed. When the reset button is pressed, the ESXMIM continues trying to contact a BOOTP server, but will timeout in approximately one minute. If the ESXMIM times out, the image is loaded from its FLASH memory.

Do NOT change the state of Switch 6 unless you have a station acting as a BOOTP server for the ESXMIM. This BOOTP station must reference a station that is acting as a TFTP server and that contains the ESXMIM image file. The ESXMIM will request the location of the image file from the BOOTP server and use the Trivial File Transfer Protocol (TFTP) to download that file from the TFTP server.

If one of these requirements is not met, the ESXMIM Forced Download operation will not be completed correctly.

- Switch 7: NVRAM Reset. The ESXMIM uses NVRAM to store user-entered parameters such as IP addresses, device name, etc. Changing the state of this switch (i.e., moving the switch from one position to another and leaving it there) resets these parameters to the factory defaults.

Once the ESXMIM resets, you can either use the defaults or re-enter your own parameters. The ESXMIM stores these parameters in NVRAM when the device powers down. These parameters remain in NVRAM until the switch changes state again.



Do not change the state of Switch 7 unless you intend to reset the ESXMIM user parameters to the factory default settings.

- Switch 8: Password Defaults. Changing the state of this switch (i.e., moving the switch from one position to another and leaving it there) clears user-entered passwords stored in NVRAM, and restores default passwords. Once reset you can use the defaults or re-enter your passwords.

Do not change the state of Switch 8 unless you want to reset the ESXMIM user-configured passwords to their factory default settings.

3.3 PRE-INSTALLATION TEST

Before installing the ESXMIM in a live network, you may want to test the module in a controlled situation to ensure that it is switching packets. You can perform this test with two workstations (see Figure 3-2), using an MMAC with an ESXMIM installed and set up as follows:

1. Install the ESXMIM into an MMAC that is not attached to a network.

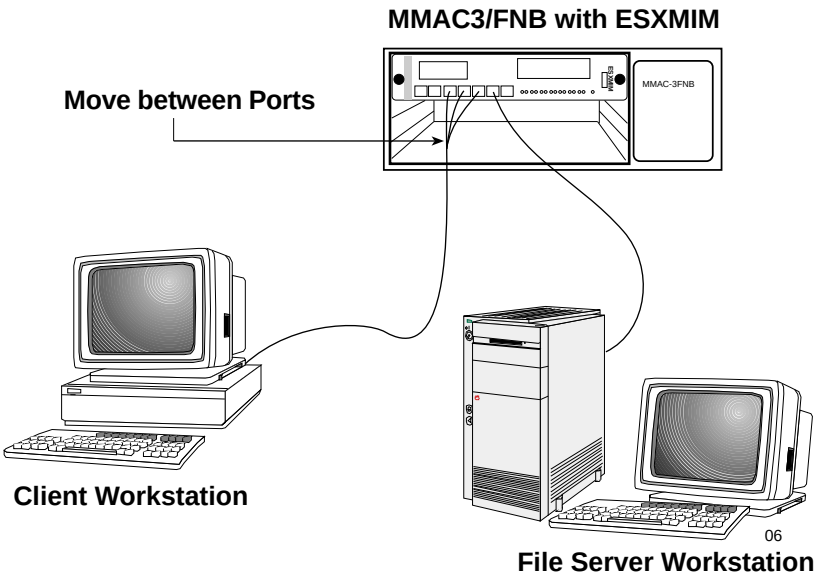


Figure 3-2 Pre-Installation Test Configuration

2. Connect the first workstation to any ESXMIM port (except for port 1).

NOTE

Port 1 requires a Local Management change to access the ESXMIM front panel (Default = Channel A connection). Refer to the Configuration Screen section of the *ESXMIM/ESXMIM-F2 Local Management Guide*.

3. Connect the second workstation to any other ESXMIM port (except for port 1).

Port 6, the EPIM, may require a transceiver or adapter for proper connection. Port 7, the BRIM, requires additional network equipment for proper testing.

4. Designate the first workstation as a file server and the second one as the client (refer to individual workstation manuals for instructions on assigning server/client relationships).
5. Send packets between the two workstations to verify the proper operation of the ESXMIM.

If a failure occurs, contact Cabletron Systems Technical Support.

3.4 INSTALLATION

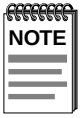
Installing the ESXMIM into any MMAC hub is an easy operation and requires no special tools. However, when you install your device, keep the following in mind:

Any installation operations should be performed only by qualified personnel.

You may install the ESXMIM in any slot except for slot 1 (farthest slot to the right) of the MMAC chassis.

Observe all antistatic precautions when handling sensitive electronic equipment.

Install the ESXMIM into the MMAC-FNB (backplane) as follows:



We recommend powering down your MMAC when inserting or removing modules, even though Cabletron Systems modules have “hot swap” capabilities.

1. Remove the safety bars that protect the chassis and remove any module to be replaced or blank MMAC slot covers, in accordance with the installation and removal procedures for these items.
2. Holding the ESXMIM by the front panel, or by the edges of the board, align the bottom and top edges of the board with the guides. Make sure that both the bottom and top edges of the card rest in these guides.
3. Slide the ESXMIM (Figure 3-3) into the desired slot of the MMAC card cage.
4. Firmly press the module connections into the backplane. Do not try to force the module into place or use the knurled knobs to draw the module into the backplane.

Forcing a misaligned module into place can damage the ESXMIM or the MMAC backplane.

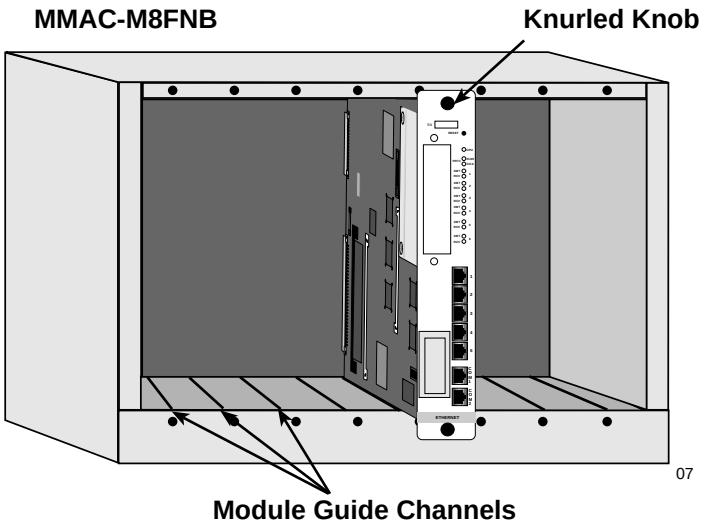


Figure 3-3 Installing the ESXMIM

5. Secure the module to the MMAC chassis by tightening the knurled knobs. If you do not tighten the knurled knobs, vibration can cause the module to lose contact with the backplane and disrupt your network.
6. Reinstall the MMAC chassis safety bars.
7. Power-up the MMAC (if it is not already **ON**).

8. Observe the status of the LANVIEW LEDs (Figure 3-4) on the ESXMIM. When the CPU LED is amber, the module is in boot state. During this approximately one minute period the ESXMIM cycles through a series of internal diagnostics.

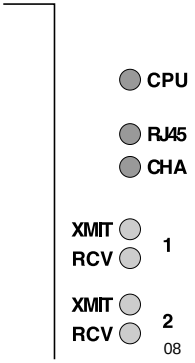


Figure 3-4 ESXMIM LANVIEW LEDs

9. After the system boot procedure, the CPU LED should be flashing green, indicating proper ESXMIM operation.

NOTE

The ESXMIM defaults to Channel A operation on initial power-up. If there is no Ethernet repeater in the modular hub, the ESXMIM must be configured to utilize the front panel interface 1 port through LM.

Proceed to Section 3.5, **Connecting to the Network**, to connect the appropriate network segments to the ESXMIM and individual EPIMs (for connections to individual BRIMs see the appropriate *BRIM Guides*).

3.5 CONNECTING TO THE NETWORK

This section gives procedures for connecting the ESXMIM and various EPIMs to the network. Refer to the list below and follow the procedures in the subsection for appropriate module type:

- **Connecting a 10BASE-T Segment to the ESXMIM**: Section 3.5.1
- **Connecting a 10BASE-F Segment to the ESXMIM-F2**: Section 3.5.2
- **Connecting a 10BASE-T Segment to an EPIM-T**: Section 3.5.3
- **Connecting a 10BASE-F Segment to an EPIM-F2 or EPIM-F3**: Section 3.5.4
- **Connecting a 10BASE-F Segment to an EPIM-F1**: Section 3.5.5
- **Connecting an AUI Segment to an EPIM-X or EPIM-A**: Section 3.5.6
- **Connecting a 10BASE2 Segment to an EPIM-C**: Section 3.5.7

3.5.1 Connecting a 10BASE-T Segment to the ESXMIM

Before connecting a segment to the ESXMIM, check each end of the segment to verify wire crossover.

To establish a link, you must have an odd number of crossovers (preferably one) between 10BASE-T devices of the same type (i.e., from repeater to repeater or switch to switch).

To connect a Twisted Pair Segment to the ESXMIM perform the following steps:

1. Align the RJ45 connector with the socket of the RJ45 port. The connector will only insert and lock if the raised locking clip of the RJ45 connector is inserted into the correct location. Figure 3-5 shows the RJ45 ports on the ESXMIM to which 10BASE-T cables may be connected.

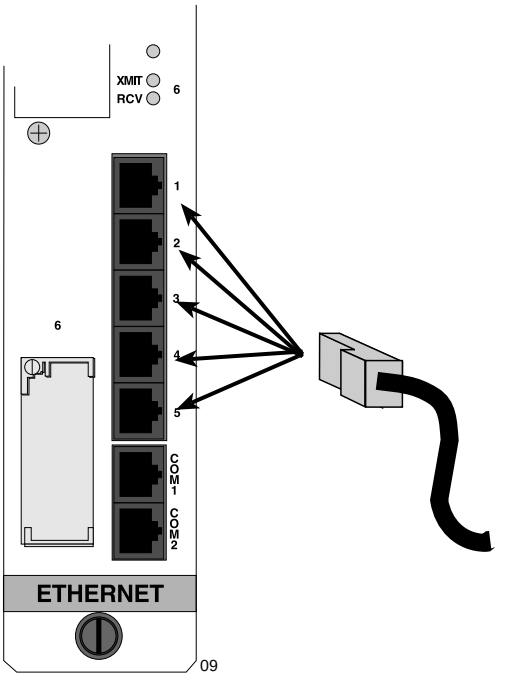


Figure 3-5 ESXMIM Twisted Pair Connection

2. Press the RJ45 connector into the port until the click of the locking clip is felt. The pressure required to perform this should be minimal. If you encounter resistance or excessive friction, remove the connector and check the port for obstruction. Also, verify that the connector and the port are of the same type.

   Once the locking clip snaps into place, the RJ45 connector will remain in the port.

3. Check for a valid link by examining the **RCV** LEDs. A solid green LED indicates that a valid link has been achieved. If the LED remains dark, perform each of the following steps until it is lit:

   a. Check that the 10BASE-T device at the other end of the twisted pair segment is ON.

   b. Verify that the RJ45 connectors on the 10BASE-T segment have the proper pinouts (Figure 3-8).

   c. Check the cable for continuity.

   d. Check that the twisted pair connection meets dB loss and cable specifications outlined in Appendix D, **Ethernet Cabling Requirements**.

If a link still has not been established, contact Cabletron Systems Technical Support.

3.5.2 Connecting a 10BASE-F Segment to the ESXMIM-F2

Each fiber optic link consists of two strands of fiber optic cabling: the transmit (TX) and the receive (RX). The transmit strand from a module port connects to the receive port of a fiber optic Ethernet device at the other end of the segment. The receive strand of the applicable port on the module connects to the transmit port of the fiber optic Ethernet device.

Cabletron Systems recommends labeling fiber optic cables to indicate receive and transmit ends. Many cables are prelabeled, providing matching labels or tapes at both ends of each strand of cable.

1. Remove the protective plastic covers from the fiber optic ports on the applicable port on the module, and from the ends of the connectors on each fiber strand.

Do not touch the ends of the fiber optic strands, and do not let the ends come in contact with dust, dirt, or other contaminants. Contamination of cable ends causes problems in data transmissions. If necessary, clean contaminated cable ends using isopropyl alcohol and a soft, clean, lint-free cloth.

2. Attach one fiber to the applicable receive port on the module. Insert the ST connector into the port with the alignment slot on the connector inserted over the locking key on the port. Turn the connector clockwise to lock it down.

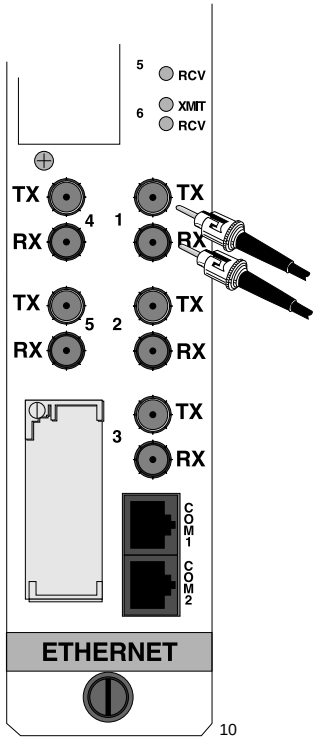


Figure 3-6 ST Connector Insertion

3. Attach the second fiber of the pair to the associated transmit port on the module. Use the same procedure for insertion of the ST connector.
4. At the other end of the fiber optic cable, attach the fiber pair to the transmit and receive ports of the device.

Check that the LNK LED for the applicable ESXMIM-F2 port is on. If the LED is not ON, that port does not have a valid link. Perform each of the following steps until you reach a resolution of the problem and achieve a link.

- Check that the device at the other end of the link is ON.
- Verify proper cross-over of the fiber strands. Try swapping the transmit and receive connections at only one end of the link.

- Verify that the fiber connection meets the dB loss specifications outlined in Appendix D, **Ethernet Cabling Requirements**.

If you are still unable to establish a link, attempt to make the connection between the devices with another fiber optic cable. If this is unsuccessful, contact Cabletron Systems Technical Support.

3.5.3 Connecting a 10BASE-T Segment to an EPIM-T

For proper operation, the EPIM-T module to be configured for use in the ESXMIM module must be of EPIM board revision 04 or greater. Board revision numbers are found following the part number printed on the Printed Circuit Board of the EPIM.

Before connecting a segment to the EPIM-T, check each end of the segment to determine wire crossover. If the wires do not cross over, use the switch on the EPIM-T to internally cross over the RJ45 port. Refer to Figure 3-7 to properly set the EPIM-T crossover switch.

To establish a link, you must have an odd number of crossovers (preferably one) between 10BASE-T devices of the same type (i.e., from repeater to repeater or transceiver to transceiver).

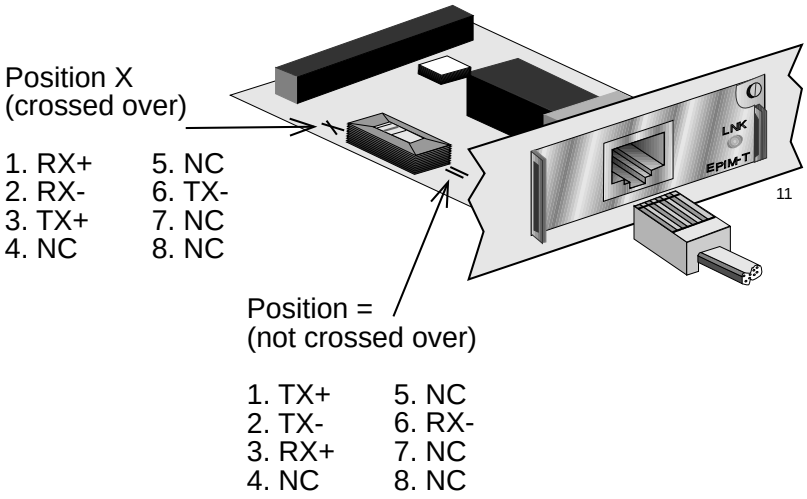


Figure 3-7 EPIM-T Crossover Switch

1. Align the RJ45 connector with the socket of the RJ45 port. The connector will only insert and lock if the raised locking clip of the RJ45 connector is inserted into the correct location.

2. Press the RJ45 connector into the port until the click of the locking clip is felt. The pressure required to perform this should be minimal. If you encounter resistance or excessive friction, remove the connector and check the port for obstruction. Also, verify that the connector and the port are of the same type.

   Once the locking clip snaps into place, the RJ45 connector will remain in the port.

3. Check that the LNK indicator LED is ON. If the indicator is not ON, the port does not have a valid link. Perform each of the following steps until you reach a resolution of the problem and achieve a link.

   a. Check that the 10BASE-T device at the other end of the twisted pair segment is ON.

   b. Verify that the RJ45 connectors on the twisted pair segment have the proper pinouts.

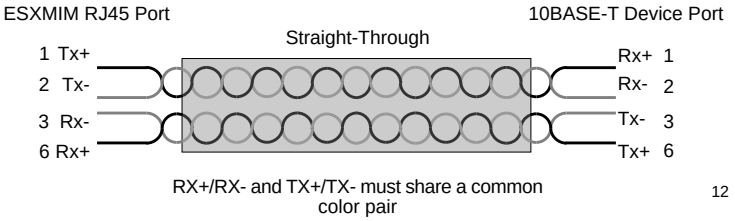


Figure 3-8 Cable Pinouts - RJ45 Port

   c. Check the cable for continuity.

   d. Check that the twisted pair connection meets dB loss and cable specifications outlined in Appendix D, **Ethernet Cabling Requirements**.

4. If you still cannot establish a link, contact Cabletron Systems Technical Support.

To remove the RJ45 connector from the port once it is locked in, grasp the cable where it enters the network device. Using your finger or a non-conductive probe (the cap of a ballpoint pen is a useful tool for recessed ports) pinch the exposed arm of the locking clip towards the main body of the housing. When the arm contacts the housing, the locking clip has been disengaged. Without releasing the arm, gently pull the RJ45 connector directly out of the port.

If the connector will not come out, there may be damage to the locking clip. Examine the arm of the locking clip. While pressing the arm back toward the shell of the connector, verify that the clip, located within the port, is being moved. If the clip is broken, you may need to use a non-conductive probe to disengage the locking clip.

Do not place foreign objects into device ports while they are connected to a power source.

3.5.4 Connecting a 10BASE-F Segment to an EPIM-F2 or EPIM-F3

For proper operation, the EPIM-F2 module to be configured for use in the ESXMIM module must be of EPIM board revision 05 or greater. EPIM-F3 modules used in the ESXMIM must be of EPIM board revision 02 or greater. Board revision numbers are found following the part number printed on the Printed Circuit Board of the EPIM.

Each fiber optic link consists of two strands of fiber optic cabling: the transmit (TX) and the receive (RX). The transmit strand from a module port connects to the receive port of a fiber optic Ethernet device at the other end of the segment. The receive strand of the applicable port on the module connects to the transmit port of the fiber optic Ethernet device.

Cabletron Systems recommends labeling fiber optic cables to indicate receive and transmit ends. Many cables are prelabeled, providing matching labels or tapes at both ends of each strand of cable.

1. Remove the protective plastic covers from the fiber optic ports on the applicable port on the module, and from the ends of the connectors on each fiber strand.

Do not touch the ends of the fiber optic strands, and do not let the ends come in contact with dust, dirt, or other contaminants. Contamination of cable ends causes problems in data transmissions. If necessary, clean contaminated cable ends using alcohol and a soft, clean, lint-free cloth.

2. Attach one fiber to the applicable receive port on the module. Insert the ST connector into the port with the alignment slot on the connector inserted over the locking key on the port. Turn the connector clockwise to lock it down.

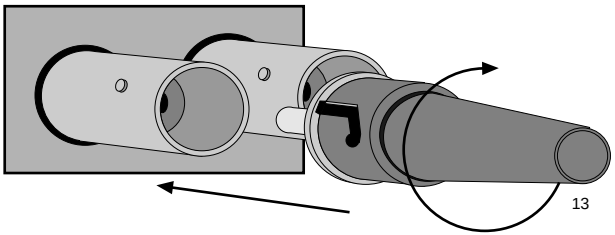


Figure 3-9 ST Connector Insertion

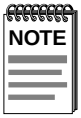
3. Attach the other fiber of the pair to the applicable transmit port on the module. Use the same procedure for insertion of the ST connector.
4. At the other end of the fiber optic cable, attach the fiber pair to the transmit and receive ports of the device.

If link indicators are present for the fiber optic connection, check that they are ON. If an indicator is present but not ON, that port does not have a valid link. Perform each of the following steps until you reach a resolution of the problem and achieve a link.

- Check that the device at the other end of the link is ON.
- Verify proper cross-over of the fiber strands. Try swapping the transmit and receive connections at only one end of the link.
- Verify that the fiber connection meets the dB loss specifications outlined in Appendix D, **Ethernet Cabling Requirements**.

If you are still unable to establish a link, attempt to make the connection between the devices with another fiber optic cable. If this is unsuccessful, contact Cabletron Systems Technical Support.

3.5.5 Connecting a 10BASE-F Segment to an EPIM-F1



For proper operation, the EPIM-F1 module to be configured for use in the ESXMIM module must be of EPIM board revision 05 or greater. Board revision numbers are found following the part number printed on the Printed Circuit Board of the EPIM.

When connecting a fiber optic link segment with SMA 906 connectors to an EPIM-F1 with SMA ports, make sure each connector uses half alignment, NOT full alignment, sleeves. A full alignment sleeve damages the receive port. SMA 905 connectors do not need alignment sleeves.

Each fiber optic link consists of two strands of fiber optic cabling: the transmit (TX) and the receive (RX). The transmit strand from a module port connects to the receive port of a fiber optic Ethernet device at the other end of the segment. The receive strand of the applicable port on the module connects to the transmit port of the fiber optic Ethernet device.

Cabletron Systems recommends labeling fiber optic cables to indicate receive and transmit ends. Many cables are prelabeled, providing matching labels or tapes at both ends of each strand of cable.

1. Remove the protective plastic covers from the fiber optic ports on the applicable port on the module, and from the ends of the connectors on each fiber strand.

Do not touch the ends of the fiber optic strands, and do not let the ends come in contact with dust, dirt, or other contaminants. Contamination of cable ends causes problems in data transmissions. If necessary, clean contaminated cable ends using alcohol and a soft, clean, lint-free cloth.

2. Attach one fiber to the receive port (RX) on the EPIM-F1. Insert the SMA connector into the port. Turn the connector clockwise until the connector will no longer turn easily. Do not overtighten the connector.

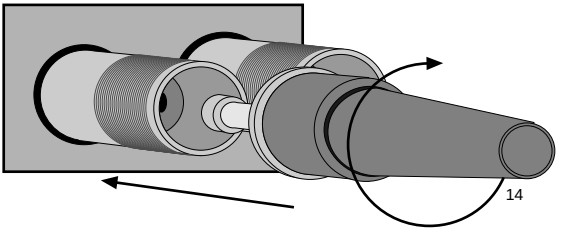


Figure 3-10 SMA Connector Insertion

3. Attach the other fiber of the pair to the applicable transmit port on the module.
4. At the other end of the fiber optic cable, attach the fiber pair to the transmit and receive ports of the device.

If link indicators are present for the fiber optic connection, check that they are ON. If an indicator is present but not ON, that port does not have a valid link. Perform each of the following steps until you reach a resolution of the problem and achieve a link.

- Check that the device at the other end of the link is ON.
- Verify proper cross-over of the fiber strands. Try swapping the transmit and receive connections at only one end of the link.
- Verify that the fiber connection meets the dB loss specifications outlined in Appendix D, **Ethernet Cabling Requirements**.

If you are still unable to establish a link, attempt to make the connection between the devices with another fiber optic cable. If this is unsuccessful, contact Cabletron Systems Technical Support.

3.5.6 Connecting an AUI Segment to an EPIM-X or EPIM-A

Ensure that the external transceiver to which the EPIM-A connects does not have the signal quality error (SQE or "heartbeat") test function enabled. The EPIM does not operate if the transceiver has the SQE test function enabled. Refer to the applicable transceiver manual for additional information.

Attach an external transceiver to the network segment intended for AUI port connection. For additional information, refer to the applicable transceiver manual.

Attach an AUI cable, no longer than 50 meters in length, to the external transceiver.

1. Align the DB15 connector of the AUI cable with the AUI port of the EPIM as shown in Figure 3-11. The port will only connect if it is properly aligned.
2. Firmly press the AUI connector over the AUI port. If there is a slide latch present for the AUI connector, slide it over the locking posts on the DB15 port.

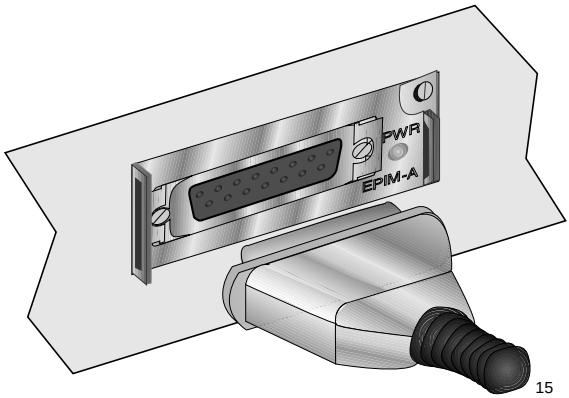


Figure 3-11 AUI Connector Insertion

3. If the transceiver **PWR** LED is OFF with the AUI cable connected:
   a. check the AUI connections for proper pinouts,
   b. check the cable for continuity,
   c. reconnect the AUI cable to the ESXMIM and the device.

If the transceiver **PWR** LED remains OFF, contact Cabletron Systems.

3.5.7 Connecting a 10BASE2 Segment to an EPIM-C

For proper operation, the EPIM-C module to be configured for use in the ESXMIM module must be of EPIM board revision 05 or greater. Board revision numbers are found following the part number printed on the Printed Circuit Board of the EPIM.

To connect a thin coaxial cable segment to an EPIM-C perform the following steps:

Before attaching a male BNC connector to a female BNC barrel connector or terminator, look into the end of the connector to verify that the gold contact pin is present and centered. Any bent or broken pins may not connect properly and should be replaced.

1. Set the Internal Termination (TERM) switch, located to the right of the port and labeled TERM, to
   a. ON position (●) to internally terminate the thin coaxial cable segment at the port. Thin coaxial cable segments may be directly connected to the port.
   b. OFF position (○) to not internally terminate the thin coaxial cable segment at the port. Segments may only be connected through T-connectors which are connected to properly terminated segments on both ends.

Failure to terminate each T-connector segment may result in improper segment operation. Place a terminator on any open female connection on the T-connector.

c. Attach a terminated thin coaxial cable segment or a terminator to the other female connector on the T-connector.

2. Align the guide channels of the BNC (male) metal housing with the locking keys of the BNC barrel (female) connector on the EPIM. Slide the metal housing of the male connector straight over the metal housing of the female connector.

3. Once the housing stops moving in, turn the metal housing clockwise while continuing to apply light forward pressure.

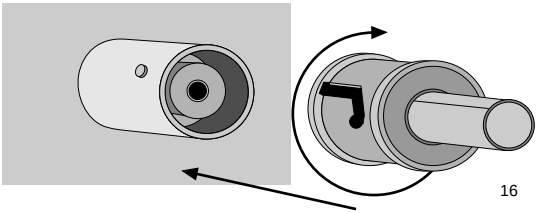


Figure 3-12 BNC Connector Insertion

4. The locking keys of the female connector will pull the connector in until they reach the circular locking holes at the end of the guide channels. The keys will click the connector into place and hold it there.

To remove the BNC connector, perform the steps above in reverse order, turning the metal housing counter-clockwise and pulling the connector straight off of the female BNC connector.

3.6 BACKPLANE TEST

If you plan to utilize the ESXMIM Channel A connection (default), you may want to verify that packets can pass over the network backplane through the ESXMIM. Again, you can use two workstations set up as file server and client. See Figure 3-13.

1. After the ESXMIM is installed in the MMAC, connect the client workstation to any ESXMIM port (except for port 1).
2. Connect the server workstation to another Ethernet MIM that is accessible from Channel A (i.e., a RIC MIM, if controlled by an EMME or EMM-E6, a MIM that resides on Channel A in a hub controlled by an IRM, or any Ethernet MIM in a hub controlled by an EMME or EMM-E6, including the management modules).
3. Send packets between the two workstations to verify the proper operation of the ESXMIM. A “ping” test will send packets from one station to another.

If a failure occurs, contact Cabletron Systems Technical Support.

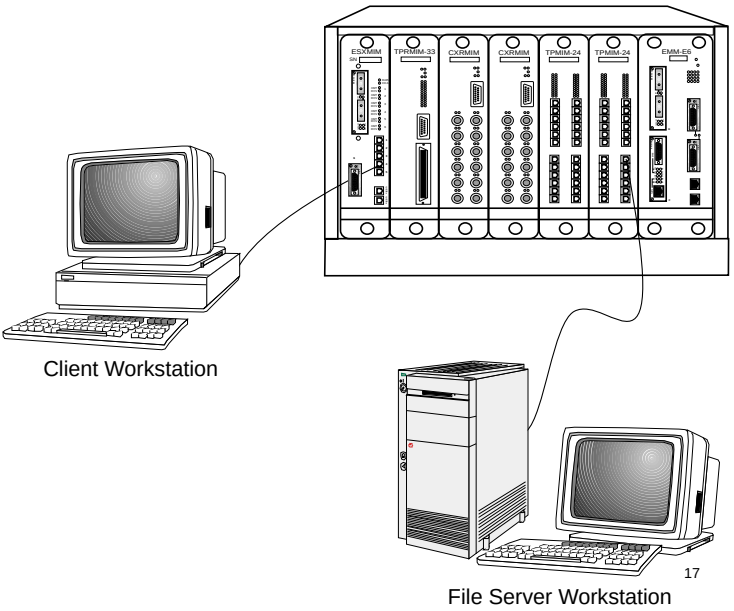


Figure 3-13 Backplane Test Configuration

CHAPTER 4
TROUBLESHOOTING

This chapter provides diagnostic and troubleshooting information.

4.1 USING LANVIEW LEDS

The ESXMIM uses the Cabletron Systems built-in visual diagnostic and status monitoring system called LANVIEW. With LANVIEW, you can quickly scan the ESXMIM LEDs to observe network status or diagnose network problems.

Table 4-1 LANVIEW LED Messages

LED	Color	Description	Error Condition/ Recommended Action
CPU	Green (Flashing)	Normal operation	If the LED is not lit, the ESXMIM may not be receiving power. See the Troubleshooting Checklist.
	Amber	Startup operations	
	Red	CPU error condition	Press the reset switch on the ESXMIM front panel to re-initialize the board. This may clear the error. If the board does not re-initialize, it has probably failed. Call Cabletron Systems Technical Support.
PRT 1: RJ45, FIBER, or CH A	Green	Indicates connection status of interface 1	Port 1 defaults to Channel A. If this LED remains off after setting Port 1 to access the faceplate RJ45 or fiber port, contact Cabletron Systems Technical Support.

Table 4-1 LANVIEW LED Messages (Continued)

LED	Color	Description	Error Condition/ Recommended Action
RCV	Green	Valid link	If a segment RCV LED does not light, check the segment cable and the status of any connecting devices. Ensure that all connected ports are enabled. Ensure that the network is actually producing Ethernet traffic.
	Amber	Receiving traffic	
XMT	Green	Transmitting packet	If none of the transmit LEDs are flashing, the ESXMIM is not transmitting frames on any of the segments. Ensure that the network is actually producing Ethernet traffic. Contact Cabletron Systems Technical Support for assistance
	Amber	Port in standby	Flashing Amber indicates the port has been placed in standby mode by the operation of the Spanning Tree Algorithm.

4.2 TROUBLESHOOTING CHECKLIST

If your ESXMIM is not operating properly, the following checklist describes some of the problems that may occur with the ESXMIM installed in an MMAC, possible causes for the problem, and suggestions for resolving the problem.

Condition	Possible Cause	Recommended Action
All LEDs are off.	Loss of power to the MMAC	Check the proper installation of the MMAC power supply module and its access to a live outlet. Check power cables for viability. Check that the MMAC has adequate power. Some configurations, especially those including FDDI modules, require that more than one power supply be installed in the MMAC. Check to see that all power supply LEDs are green.
	ESXMIM not properly installed	Re-install ESXMIM in hub according to instructions in Chapter 3.
	MMAC power bus failure	Install ESXMIM in a different MMAC slot.
	ESXMIM connector pin damage	Examine ESXMIM backplane connectors for evidence of bent or broken pins.
No Local Management Password Screen.	Incorrect terminal setup	Review terminal or emulation settings for accordance with requirements.
	Improper console cable pinout	Refer to Appendix A for proper console port pinouts.

Condition	Possible Cause	Recommended Action
Cannot contact the ESXMIM from in-band management	Improperly configured Community Names table	Refer to *ESXMIM/ESXMIM-F2 Local Management Guide* for Community Names table setup.
	ESXMIM does not have an IP address	Refer to *ESXMIM/ESXMIM-F2 Local Management Guide* for IP address Setup Screen information.
	No link to device	Check link to device for validity and proper functioning of all intermediary devices.
User Parameters (IP address, Device and Module Name, etc.) are lost when device is powered down	Switch 7 has been toggled and user-entered parameters have been reset to factory default	Reset one or more parameters and cycle power to module. If parameter altered has remained in memory, re-configure remaining parameters. *Do not* change the position of switch 7 to attempt to rectify this situation. See Chapter 3, **Installation**, for details.
	NVRAM may be defective	If NVRAM is defective, call Cabletron Systems Technical Support.

4.3 USING THE RESET SWITCH

The ESXMIM incorporates a recessed reset switch, located above the LEDs (See Chapter 2, **Controls and Indicators**, for location). This reset switch initializes the ESXMIM processor. This switch does *not* initialize Non-Volatile Random Access Memory (NVRAM), the non-volatile random access memory where the ESXMIM stores network management parameters.

To use the reset switch, use a pen or pencil to press the switch in. When this is done, the ESXMIM initializes itself.

The reset sequence for the ESXMIM may last approximately one minute. The final time may change depending upon the configuration of the chassis in which the ESXMIM is located. Only after the reset sequence is completed will bridging or switching resume.

APPENDIX A
SPECIFICATIONS

This appendix lists some of the important specifications and specified requirements for the ESXMIM. Cabletron Systems reserves the right to change these specifications at any time and without notice.

A.1 PHYSICAL PROPERTIES

Dimensions:	29.21 cm H x 5.08 cm W x 34.07 cm D (11.5 in H x 2 in W x 13.4 in D)
Weight (unit)	1.25 kg (2.75 lbs)
Weight (as shipped)	1.74 kg (3.83 lbs)

A.2 OPERATING PROPERTIES

Internal Processor(s)	2 Intel 80960
Ethernet Controller	6 DP83932 Controllers
Shared Memory	4 MB (Expandable to 12 MB)
Read Only Memory (NVRAM)	256 K
FLASH Memory	2 MB (Expandable to 8 MB)
CPU Memory (Local Memory)	4 MB (Expandable to 12 MB)
Filtering Table	8,191 entries max.
Ageing Time	5 minutes (default)

A.3 ENVIRONMENTAL REQUIREMENTS

Operating Temperature 5°C to 40°C (41°F to 104°F)

Storage Temperature -30°C to 90°C (-22°F to 194°F)

Operating Humidity 5% to 95% (non-condensing)

Waste Heat Production under normal conditions:

ESXMIM	approx. 245 BTU/hr
ESXMIM-F2	approx. 270 BTU/hr

A.4 CERTIFICATION

Safety	UL 1950, CSA C22.2 No. 950, EN 60950, and IEC 950
Emission	FCC Part 15 Class A, VCCI Class i, and EN 55022 Class A
Immunity	EN 50082-1

A.5 COM PORT PINOUT

Type: Standard RJ45 port

Pin	Function	Connection Attitude
1	Transmit Data (XMT)	From COM 2 port
2	Data Carrier Detect (DCD)	From COM 2 port
3	Data Set Ready (DSR)	To COM 2 port
4	Receive Data (RCV)	To COM 2 port
5	Signal Ground (GND)	NA
6	Data Terminal Ready (DTR)	From COM 2 port
7	Request to Send (RTS)	To COM 2 port
8	Clear to Send (CTS)	NA

APPENDIX B
BRIM/EPIM INFORMATION

This appendix lists the BRIM modules and EPIM modules which may be used within the Cabletron Systems ESXMIM.

B.1 ESXMIM-CAPABLE BRIMS

The ESXMIM supports the incorporation of the following BRIMs:

BRIM-A100: ATM BRIM. The BRIM-A100 supports a 100 Mbps ATM connection through the use of a single Fixed Shroud Duplex (FSD) port.

BRIM-A6: ATM BRIM. The BRIM-A6 supports the use of ATM Port Interface Modules (APIMs). The following APIM types will operate in an ESXMIM-based BRIM-A6:

- **APIM-11**: 100 Mbps TAXI interface with one multimode fiber optic SC port
- **APIM-21**: 155 Mbps OC-3 interface with one multimode fiber optic SC port
- **APIM-29**: 155 Mbps OC-3 interface with one single mode fiber optic SC port
- **APIM-22**: 155 Mbps STS3 interface with one Category 5 UTP RJ45 port
- **APIM-67**: 45 Mbps DS3 interface with 75Ω BNC connectors

BRIM-A6 DP: ATM BRIM. The BRIM-A6 DP supports the use of the same APIMs as the BRIM-A6 (above).

BRIM-E6: 10 Mbps Ethernet BRIM. The BRIM-E6 supports the use of EPIMs. The EPIM types that are currently available are listed in Section B.2, **ESXMIM-Capable EPIMs**.

BRIM-E100: 100 Mbps Fast Ethernet BRIM. The BRIM-E100 supports the use of Fast Ethernet Interface Modules. The following Fast Ethernet Interface Modules will operate in an ESXMIM-based BRIM-E100:

- **FE-100TX**: Category 5 UTP interface with one RJ45 port
- **FE-100FX**: Multimode fiber optic interface with one duplex SC port

BRIM-F0: 100 Mbps FDDI Dual Attached Station (DAS) BRIM. The BRIM-F0 provides two Multimode Fiber Optic - Physical Medium Dependent (MMF-PMD) compliant Media Interface Connector ports.

BRIM-F5: 100 Mbps FDDI Dual Attached Station (DAS) BRIM. The BRIM-F0 provides two Single Mode Fiber Optic - Physical Medium Dependent (SMF-PMD) compliant Media Interface Connector ports.

BRIM-F6: 100 Mbps FDDI Dual Attach Station (DAS) BRIM. The BRIM-F6 supports the use of FDDI Port Interface Modules (FPIMs). The following FPIM types are currently available:

- **FPIM-00**: MMF-PMD FDDI Port Interface Module with one multimode fiber optic Media Interface Connector port
- **FPIM-01**: MMF-PMD FDDI Port Interface Module with one multimode fiber optic SC port
- **FPIM-02**: TP-PMD FDDI Port Interface Module with one UTP RJ45 port
- **FPIM-04**: TP-PMD FDDI Port Interface Module with one STP RJ45 port
- **FPIM-05**: SMF-PMD FDDI Port Interface Module with one single mode fiber optic Media Interface Connector port
- **FPIM-07**: SMF-PMD FDDI Port Interface Module with one single mode fiber optic SC port

CRBRIM-W/E: Cisco Router Ethernet to Wide Area BRIM. The CRBRIM-W/E provides one internally-connected Ethernet interface and two external Wide Area Network interfaces. The CRBRIM-W/E is available with three levels of functionality:

- **CRBRIM-W/E-IP**: Routes TCP/IP traffic only
- **CRBRIM-W/E-DESKTOP**: Routes IP, IPX, DECNet, and AppleTalk protocols
- **CRBRIM-W/E-ENT**: Routes all standard Cisco protocols

B.2 ESXMIM-CAPABLE EPIMS

The following list details the currently available EPIMs:

- **EPIM-T**: 10BASE-T interface with RJ45 port
- **EPIM-F1**: FOIRL multimode interface with SMA connectors
- **EPIM-F2**: 10BASE-F multimode interface with ST connectors
- **EPIM-F3**: 10BASE-F single mode interface with ST connectors
- **EPIM-C**: 10BASE2 interface with BNC connector
- **EPIM-A**: AUI interface, male AUI port
- **EPIM-X**: AUI interface, female transceiver port

APPENDIX C
UPGRADING THE ESXMIM

This appendix describes how to incorporate additional or expanded capabilities into the ESXMIM. This appendix describes the procedures for the addition of a BRIM or EPIM module and the addition of Single In-line Memory Modules (SIMMs).

C.1 LOCATING BRIM CONNECTORS

This section points out Bridge Router Interface Module (BRIM) connector locations on your ESXMIM board. Refer to your BRIM Guide for specific installation procedures and additional information.

The following diagram (Figure C-1) shows BRIM connector locations for the ESXMIM:

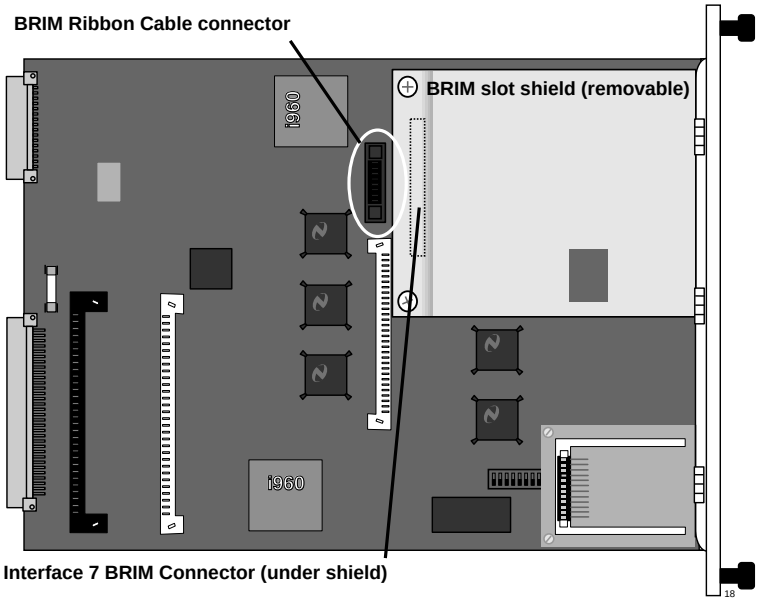


Figure C-1 BRIM Connector Locations

C.2 ADDING EPIMS

This section contains procedures for adding or replacing an Ethernet Port Interface Module (EPIM) to upgrade or change the capabilities of your ESXMIM. After installing your new EPIM, refer to Chapter 3, **Installation**, for network connection instructions.

Observe all antistatic precautions when handling sensitive electronic equipment.

To install an EPIM, perform the following steps:

When removing an existing EPIM, make sure to pull the module straight out to avoid damage to the connector.

1. Remove the coverplate or the existing EPIM (whichever applies).
2. Slide your new EPIM into place, making sure the connectors on the rear of the module and inside the ESXMIM attach properly. Refer to Figure C-2.
3. Install the mounting screw.

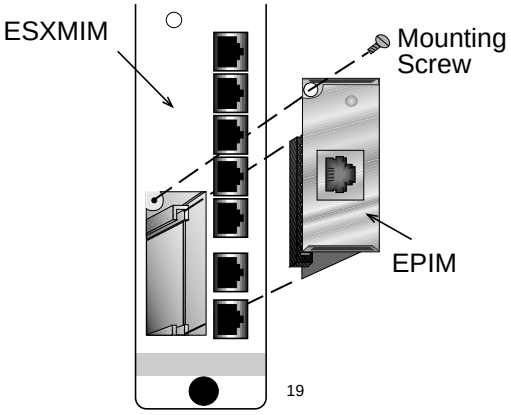


Figure C-2 Installing an EPIM

C.3 SIMM UPGRADES

The ESXMIM allows memory upgrades for Shared DRAM, Local DRAM, and FLASH EEPROM. This section explains how to locate and add/replace a Single In-line Memory Module (SIMM) for any of these memory types. For information on the available SIMM upgrades and information on ordering them, contact your Cabletron Systems Sales Representative.

C.3.1 Locating SIMMs

Each memory type has a specific SIMM slot location on the ESXMIM motherboard. When installing SIMM boards, make sure that you place them in their proper slots. Figure C-3 illustrates the ESXMIM SIMM slot locations and the direction (indicated by the white arrows) in which to install the SIMMs.

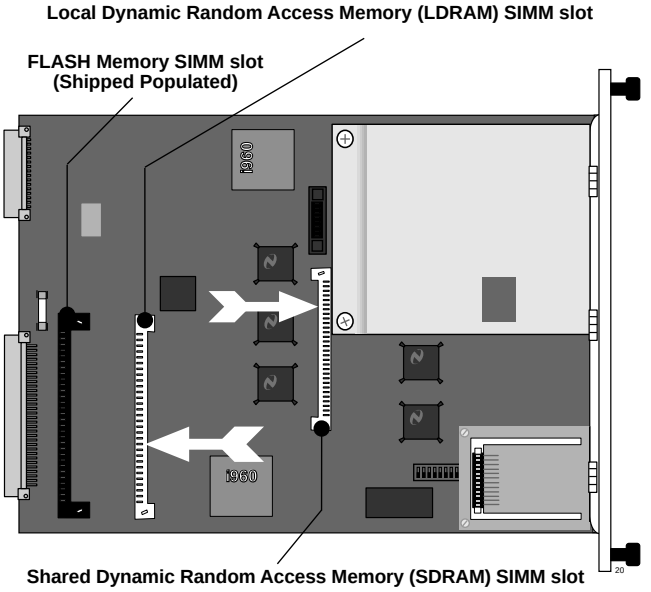


Figure C-3 SIMM Slot Locations

C.3.2 Installing SIMMs

The ESXMIM has two SIMM slot types. FLASH SIMMs use an angle-down slot (where the SIMM rotates down to a horizontal locked position). SDRAM and LDRAM SIMMs use an angle-up slot (where the SIMM rotates up to a vertical locked position).

Installing a SIMM in either slot is a simple two-step process. After finding the proper SIMM slot location (Figure C-3), refer to the proper illustration and procedures for each SIMM slot type.

C.3.2.1 Installing a FLASH SIMM

Observe all antistatic precautions when handling sensitive electronic equipment.

1. Insert the SIMM between the connector teeth in the SIMM slot.
2. Pivot the SIMM down until it locks into the clips in the SIMM slot, and the SIMM holes fit over the SIMM slot posts. (See Figure C-4.)

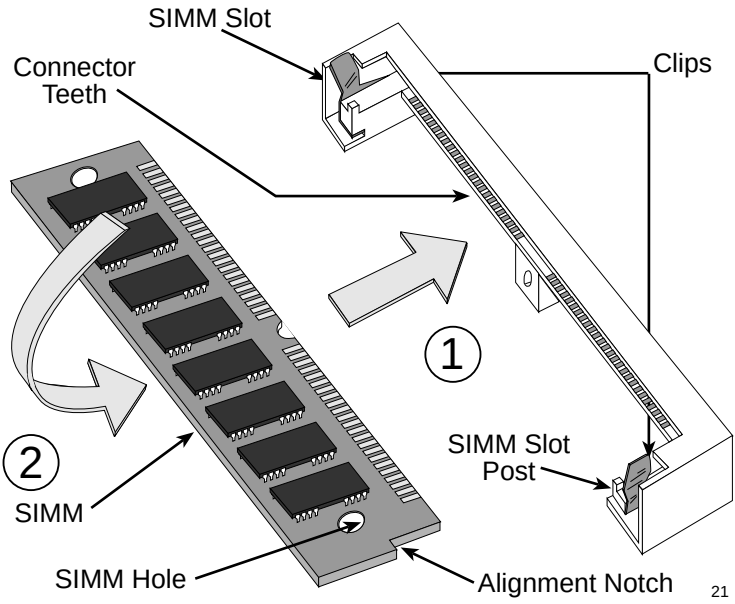


Figure C-4 Installing a FLASH SIMM

C.3.2.2 Installing an SDRAM or LDRAM SIMM

Observe all antistatic precautions when handling sensitive electronic equipment.

1. Insert the SIMM, between the connector teeth in the SIMM slot.
2. Pivot the SIMM back until it locks into the clips in the SIMM slot, and the SIMM holes fit over the SIMM slot posts. (See Figure C-5.)

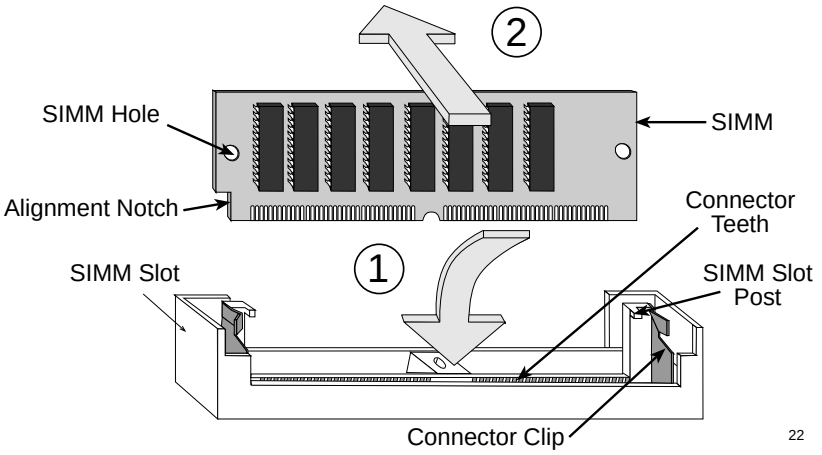
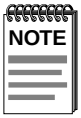


Figure C-5 Installing an SDRAM or LDRAM SIMM

APPENDIX D
ETHERNET CABLING REQUIREMENTS

This chapter contains general networking guidelines. Before attempting to install the ESXMIM or any additional EPIMs or BRIMs, review the requirements and specifications outlined in this chapter.



Your network installation must meet the conditions, guidelines, specifications, and requirements included in this chapter to ensure satisfactory performance of this equipment. Failure to follow these guidelines may result in poor network performance.

D.1 NETWORK REQUIREMENTS

Take care in planning and preparing the cabling and connections for your network. The quality of the connections, the length of cables, and other conditions of the installation play critical roles in determining the reliability of your network.

Refer to the sections which follow that apply to your specific network configuration.

D.1.1 10BASE-T Twisted Pair Network

When connecting a 10BASE-T segment to any of the 10BASE-T hub interfaces (ESXMIM Interfaces 1 - 5 or a Twisted Pair Ethernet Port Interface Module [EPIM-T]), ensure the network meets the following requirements:

- **Length**: The IEEE 802.3 10BASE-T standard requires that 10BASE-T devices transmit over a 100 meter (328 foot) link using 22-24 AWG unshielded twisted pair wire. However, cable quality largely determines maximum link length. If you use high quality, low attenuation cable, you can achieve link lengths of up to 200 meters. Cable delay limits the maximum link length to 200 meters.

Losses introduced by connections at punch-down blocks and other equipment reduce total segment length. For each connector or patch panel in the link, subtract 12 meters from the total length of your cable.

- **Insertion Loss**: Between frequencies of 5.0 and 10.0 MHz, the maximum insertion loss must not exceed 11.5 dB. This includes the attenuation of the cables, connectors, patch panels, and reflection losses due to impedance mismatches in the link segment.
- **Impedance**: Cabletron Systems 10BASE-T products work on twisted pair cable with 75 to 165 ohms impedance. Unshielded twisted pair cables typically have an impedance of between 85 and 110 ohms. You can also use Shielded Twisted Pair cables, such as IBM Type 1 cable, but keep in mind that this cable has an impedance of 150 ohms. The high impedance of the IBM Type 1 cable increases signal reflection. However, due to cable shielding and the subsequent lack of crosstalk between shielded pairs, signal reflection has little effect on the quality of the received signal.
- **Jitter**: Intersymbol interference and reflections can cause jitter in the bit cell timing, resulting in data errors. 10BASE-T links must not generate more than 5.0 ns of jitter. Make sure your cable meets 10BASE-T link impedance requirements to rule out jitter as a concern.
- **Delay**: The maximum propagation delay of a 10BASE-T link segment must not exceed 1000 ns. This 1000 ns maximum delay limits the maximum link segment length to no greater than 200 meters.
- **Crosstalk**: Signal coupling between different cable pairs within a multi-pair cable bundle causes crosstalk. 10BASE-T transceiver design alleviates concerns about crosstalk, provided the cable meets all other requirements.
- **Noise**: Crosstalk, or externally induced impulses, can cause noise. Impulse noise may cause data errors if the impulses occur at very specific times during data transmission. Generally, noise is not a concern. If you suspect noise-related data errors, you may need to reroute the cable or eliminate the source of the impulse noise.

- **Temperature**: Multi-pair PVC 24 AWG telephone cables typically have an attenuation of approximately 8-10 dB/100 m at 20° C (68° F). The attenuation of PVC insulated cable varies significantly with temperature. At temperatures greater than 40° C (104° F), we strongly recommend using plenum-rated cable to ensure attenuation remains within specification.

D.1.2 Multimode Fiber Optic Network

When connecting a multimode fiber optic link segment to the ESXMIM-F2 or a hub (using an EPIM-F1/F2), ensure the network meets the following requirements:

- **Cable Type**: Use the following multimode fiber optic media:

  - 50/125 µm fiber optic cabling
  - 62.5/125 µm fiber optic cabling
  - 100/140 µm fiber optic cabling

- **Attenuation**: You must test the fiber optic cable with a fiber optic attenuation test set adjusted for an 850 nm wavelength. This test verifies that the signal loss in a cable falls within the following acceptable levels:

  - 13.0 dB or less for a 50/125 µm fiber cable segment
  - 16.0 dB or less for a 62.5/125 µm fiber cable segment
  - 19.0 dB or less for a 100/140 µm fiber cable segment

- **Budget and Propagation Delay**: When you determine the maximum fiber optic cable length to incorporate fiber runs into your network, you must calculate and consider the fiber optic budget (a total loss of 10.0 dB or less is permissible between stations) and total network propagation delay.

  To determine the fiber optic budget, combine the optical loss due to the fiber optic cable, in-line splices, and fiber optic connectors. Typical loss for a splice and connector (together) equals 1 dB or less.

Network propagation delay is the amount of time it takes a packet to travel from the sending device to the receiving device. Total propagation delay allowed for the entire network must not exceed 25.6 µs in one direction (51.2 µs round trip). If the total propagation delay between any two nodes on the network exceeds 25.6 µs, you must use bridges or switches.

- **Length**: The maximum possible multimode fiber optic cable length is 2 km (1.24 miles). However, IEEE 802.3 FOIRL specifications specify a maximum of 1 km (0.62 miles).

D.1.3 Single Mode Fiber Optic Network

When connecting a single mode fiber optic link segment to a hub (using an EPIM-F3), ensure the network meets the following requirements:

- **Cable Type**: Fiber optic link segments should consist of 8/125 or 12/125 µm single mode fiber optic cabling. You can also use 62.5/125 µm multimode cable with the EPIM-F3; however, multimode cable allows for greater optical loss, and limits the possible distance to 2 km.
- **Attenuation**: You must test the fiber optic cable with a fiber optic attenuation test set adjusted for a 1300 nm wavelength. This test verifies that the signal loss in a cable falls within the acceptable level of 10.0 dB or less for any given single mode fiber optic link.
- **Budget and Propagation Delay**: When you determine a maximum fiber optic cable length, you must calculate and consider the fiber optic budget (a total loss of 10.0 dB or less between stations) and total network propagation delay.

  To determine the fiber optic budget, combine the optical loss due to the fiber optic cable, in-line splices, and fiber optic connectors. Typical loss for a splice and connector (together) equals 1 dB or less.

  Network propagation delay is the amount of time it takes a packet to travel from the sending device to the receiving device. Total propagation delay for the entire network must not exceed 25.6 µs in one direction (51.2 µs round trip). If the total propagation delay exceeds 25.6 µs, you must use bridges or switches to re-time the signal.

- **Length**: If you meet all system budgets, the maximum single mode fiber optic cable length can reach 5 km (3.1 miles) with bridges or switches at each segment end. FOIRL specifications specify a maximum of 1 km (0.62 miles).

D.1.4 10BASE2 Coaxial Cable Network

When connecting a thin coaxial cable segment to your hub (using an EPIM-C), ensure your network meets the following requirements:

- **Cable Type**: Use only 50 ohm RG-58A/U type coaxial cable for thin coaxial cable segments.
- **Length**: The thin coaxial cable segment must not exceed 185 meters.
- **Terminators**: Terminate each end of a thin coaxial cable segment.
- **Connectors**: You can use up to 29 T-connectors throughout the length of the cable segment for host connections. Ensure that all connections are spaced 0.5 meters or more from one another or from terminators.

  If you use an excessive number of barrel connectors within the cable segment (e.g., finished wall plates with BNC feed-throughs), you may need to reduce the number of host connections. For special network design information, contact Cabletron Systems Technical Support.
- **Grounding**: For safety, ground only *one* end of a thin coaxial cable segment. Do NOT connect EPIM BNC ports to earth ground.

Connecting a thin coaxial cable segment to earth ground at more than one point could produce dangerous ground currents.

D.1.5 Transceiver Requirements

When you connect an external network segment to an EPIM-A in your hub through a transceiver, that transceiver must meet IEEE 802.3 standards or Ethernet version 1.0 or 2.0 requirements. The transceiver must also have SQE disabled.

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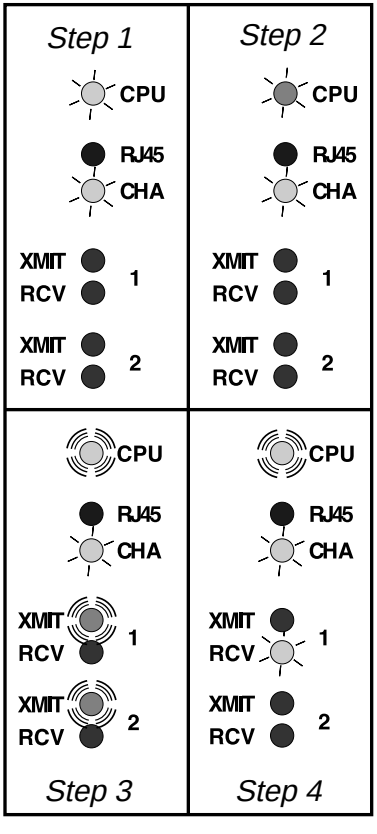
Boot-Up Sequence

When initially powered on or reset, the ESXMIM will cycle through a series of diagnostics and startup procedures. During this time, the LEDs will move through the following conditions:

Amber: ● Steady: ☼

Green: ○ Flashing: ◎



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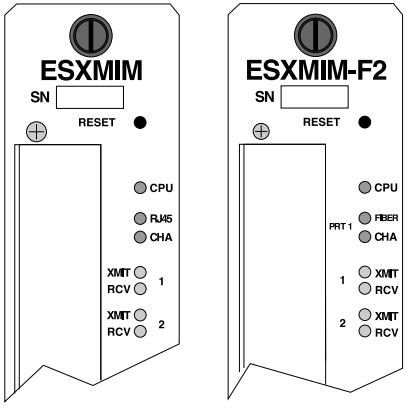
9031868
April 1996

ESXMIM/ESXMIM-F2 Quick Reference Card

LANVIEW LEDs



LED	Description
CPU	Green: Operating properly.
	Amber: Starting up.
	Red: CPU error condition.
PRT1:RJ45	Green: Interface 1 assigned to faceplate RJ45 port 1.
PRT1:FIBER	Green: Interface 1 assigned to faceplate ST port pair 1.
PRT1:CH A	Green: Interface 1 connected to MMAC backplane.
RCV	Green: Valid link from station to ESXMIM interface.
	Amber: Segment receiving.
XMIT	Green: Segment transmitting.
	Red: Port in standby due to Spanning Tree operation.

Switch Settings

Never adjust switch settings while the ESXMIM is on. Not only is this dangerous, but the *change in state* (i.e., position) activates the switch function only after reinstalling or cycling power to the board.

Switch	Function
1	Cabletron Systems Use Only.
2	Cabletron Systems Use Only.
3	Not Used.
4	Not Used.
5	Cabletron Systems Use Only.
6	Forced Download. When toggled, forces image files to be loaded from BOOTP server by clearing information from NVRAM.
7	NVRAM Reset. When toggled, deletes user parameters stored in NVRAM and returns these parameters to factory default settings.
8	Password Default. When toggled, deletes user defined passwords stored in NVRAM and returns these passwords to factory default settings (public or [RETURN]).

Installation

Any installation operations must be performed only by qualified personnel.

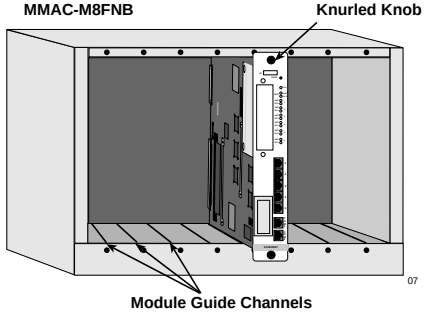
NOTE

We recommend powering down your MMAC when inserting or removing modules, even though Cabletron Systems modules have "hot swap" capabilities.

1 Power down the MMAC.

2 Remove any safety bars that protect the chassis and remove the module to be replaced or blank MMAC slot covers, in accordance with the installation and removal procedures for these items.

3 Slide the ESXMIM into any MMAC Media Interface Module slot except slot 1 (the half-width management module slot) as shown below.



4 Secure the module by tightening the knurled knobs at the top and bottom of the module.

5 Replace the safety bars on the MMAC chassis.

6 Power on the MMAC chassis. Refer to the boot-up sequence information on the back of this card.